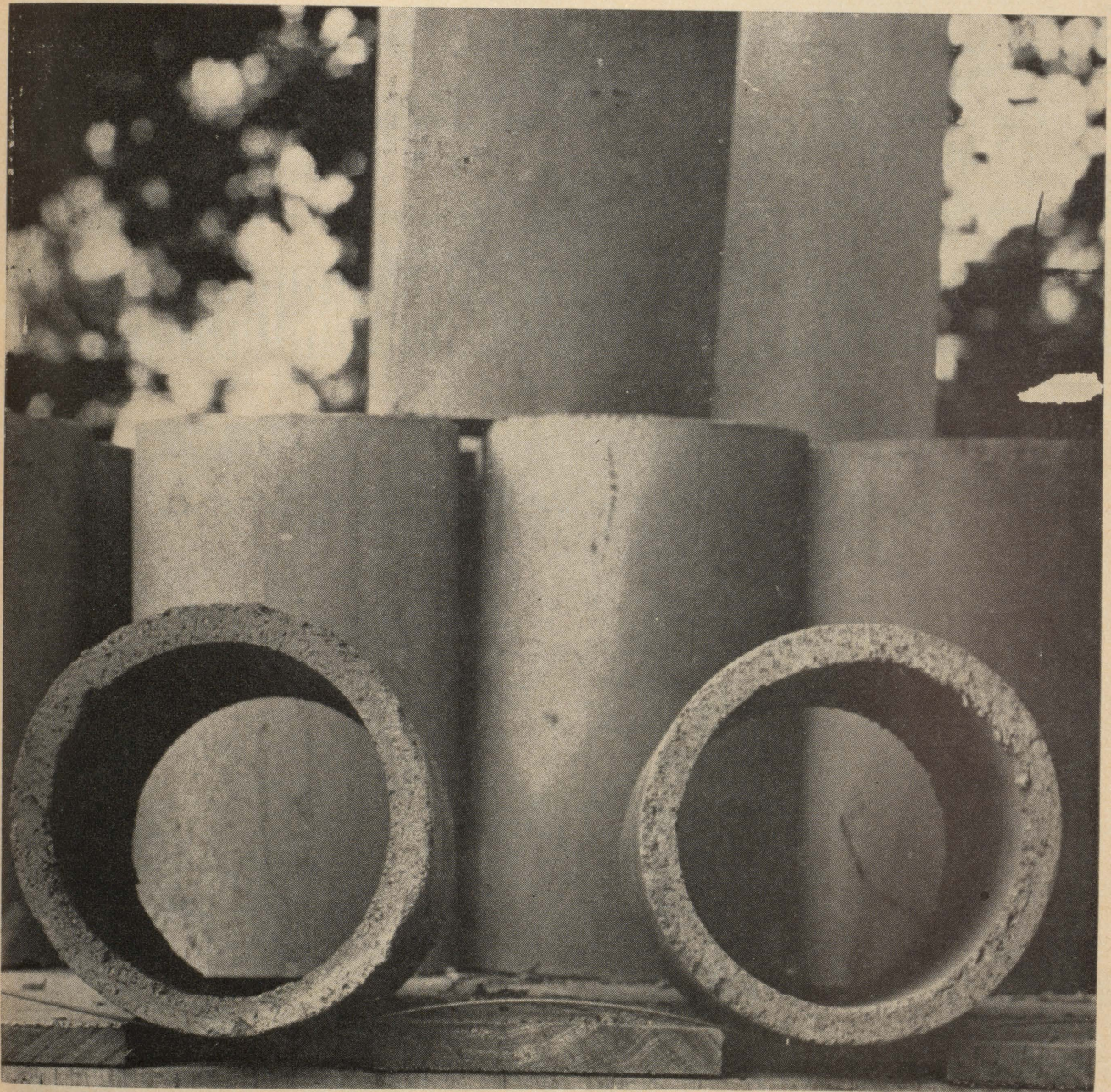


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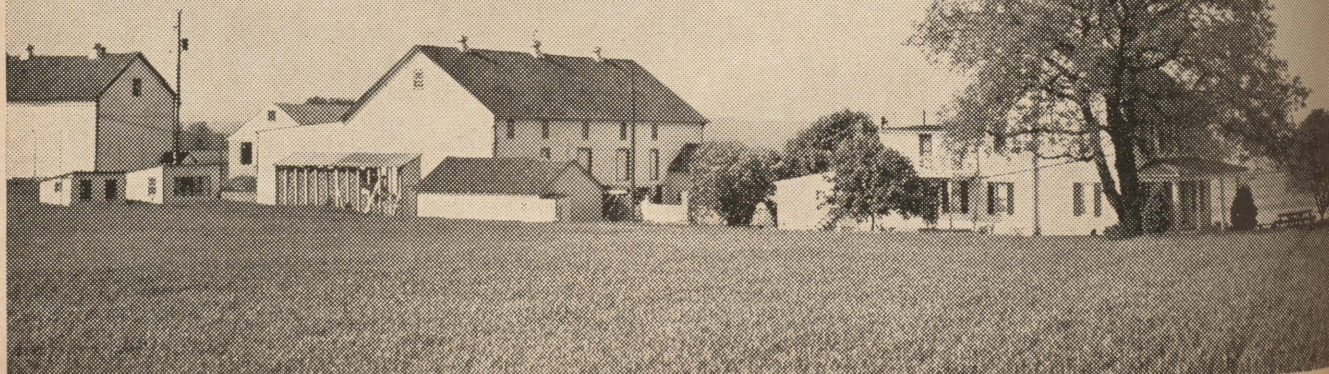
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In This Issue

| | |
|---|----|
| Editorial | 2 |
| We're Planting the Seed Early . . . Buy Pedigreed | 3 |
| Land Drainage in Canada | 6 |
| Macdonald Reports | 11 |
| The Family Farm | 12 |
| This Month with the QWI | 17 |

Journal Jottings

Having been told several times
that there is no such thing as a
foolish question — only foolish
answers, I decided to spend
a good part of the summer
visiting different Departments on
Campus and asking questions. Did
I get any foolish answers? Not
one. On the contrary, I got some
good, solid information on a wide
variety of topics that I think you
will read with interest over the
coming months. Joan Habel of the
Extension Department joined me
for the interview with Dr. Klinck
of the Agronomy Department. The
first of three articles that we
earned from this meeting
appears in this issue.

For the most part, in arranging
interviews with different Faculty
members I have tried to ask the
questions that I think you might
want to ask. In one or two
instances I "asked" the questions
that the professor felt should
be answered. Both ways worked
well and we will try, in the
months ahead, to set up more
interviews to complement the
material already scheduled. If
there are particular questions you
would like me to ask for you, why
don't you let me know? I'll try and
get an answer for you.

Hazel M. Clarke

Well, another school year has begun at MAC and contrary to rumours otherwise, the "old place" is not being packed-up, moved, dissolved, or phased out. In fact, Macdonald is very much engaged in an expansion period. New academic programs were being planned during the summer. New buildings and physical plans for the campus are also in the planning stages.

But aside from these expansion plans which are still on paper, the most encouraging evidence that Macdonald is expanding comes from this year's increase in enrolment. This fall 857 students (including Diploma, Undergraduate, and Graduate) are enrolled at Macdonald. This represents about a 28 per cent increase over last year's enrolment of 660 students.

This increase in enrolment is certainly gratifying to us at Macdonald who have worked so hard to build up the college and its academic programs during its period of continual "crisis". But aside from the direct benefit to

those of us on campus, I think it represents an encouraging trend in the field of agriculture. Many of these new students at Macdonald are from urban areas and often are very unfamiliar with agricultural conditions in Canada. Yet generally they all have an intense interest and drive to enter the field of agriculture in some capacity. Many of them, in fact, have every intention of buying a farm and farming.

Now there has been a lot of publicity recently over this return to the land movement and how it may have some bad effects on the rural community and the agricultural economy. This may or may not happen. The effect of these new farmers being unfamiliar with conventional farming techniques and the use of the land may be more than offset by the new ideas, skills, and resources they may introduce to the community. But the fact

that more and more of these new farmers are coming to an agricultural college to get a sound training in agriculture may be a major step in eliminating much of this misunderstanding, mistrust, and ill feeling that has resulted.

One last reminder is that Macdonald College will have open house during its Annual Macdonald Royal on October 18 and 19. Each department at the College will have displays showing its various teaching and research activities. Why not take this opportunity to learn what Macdonald College is all about.

Gordon Bachman.

We're Planting the Seed Early

Buy Pedigreed

Prior to leaving for a year's sabbatical leave, Dr. H. R. Klinck of the Agronomy Department took time from his busy schedule to discuss several subjects with Joan Habel of the Extension Department and Hazel M. Clarke of the Journal. Questions for this article will appear in italics. Other articles will appear in future issues.

Could you tell us a little about your own interest in pedigreed seed?

Professor Klinck: Pedigreed seed production has been of interest to people at Macdonald since its beginning in 1905. The present Canadian Seed Growers Association, an organization with about 7,000 farmer-members, some non-farmer members, plant breeders and so on which is the pedigreeing agency for pedigreed seed in Canada, really got its beginnings right here at Macdonald College. At the start it was known as the Macdonald Robertson Seed Growers Association. They began by running contests among the farm young people who picked the best heads out of the field and had competitions to see who could send in the best ones.

Since the beginning, someone in the Agronomy Department has been involved with the Association in one way or another. My own involvement began in 1954 when I was appointed to the Board of Directors of the Association. Over the years I became involved in various committees and served as President of the Association from 1967 to 1969. Since that time I have been chairman of their Plant Breeders Committee which is an advisory committee to the

Board on matters pertaining to the more technical aspects of plant breeding and seed technology.

Should farmers buy their seed early, and should they only buy pedigreed seed?

Professor Klinck: Yes, they should buy early, particularly in a year when there may be shortages. Buying seed early also forces planning which one should do in a good operation. If a farmer plans on using his own seed and cleaning it, then I would stress even more that he have it cleaned early.

Whether he should buy only pedigreed seed depends on what he already has. If he is using a known variety — he may have started off with registered or certified seed a couple of years back — and if he is only growing one variety and isn't handling it in any way that it will get mixed with other varieties, if he is not involved with custom combining or with helping his neighbours, if his equipment is not going back and forth, then there is no reason why he should not use his own seed for several years. If he is going to buy seed, however, then I would say definitely that he should only buy pedigreed seed simply because of the new regulations which were brought in about a year or two ago where, under the Canada Seeds Act, it is no longer permissible for any variety of cereals, or any other seed for that matter, to be sold by a variety name as non-pedigreed seed. Under the Canada Seeds Act, there are the pedigreed seed classes, and there is one general class usually referred to as commercial seed which can only be

sold as, let's say, No. 1. timothy or No. 1 oats. A variety name cannot be put on it, which means that if a farmer goes to a seed dealer to buy seed and he purchases this kind of seed he doesn't know what he is getting. It is probably good seed because there are standards which control the sale of seed to the extent that it must meet minimum germination standards and minimum requirements for weed seed content. Thus it is not bad seed in that sense, but there is no guarantee as to variety, and we all know the importance of variety. Consequently, I think one could only recommend the purchase of pedigreed seed.

Is there a shortage of certain varieties of seed for certain crops?

Professor Klinck: This varies a great deal from year to year. The biggest problem this year was corn. Because of the frost that occurred in 1974 during the seed production period, certain varieties were in short supply. In cereals or forage crops there is almost certain to be a shortage of certain specific varieties, but at the same time there usually are enough substitute varieties that are known. There are very few situations where you are limited to a single variety; there is usually half a dozen to choose from. If the farmer is conscious enough of the variety concept that he asks for a certain variety, then this, of course, is a good sign.

What is so special about pedigreed seed?

Professor Klinck: The fact that it is pedigreed seed means that it is traceable back to an origin

genetically, just as a pedigreed animal can be traced back to its parents, its grandparents, and its great grandparents. Any bag or any lot of pedigreed seed is traceable right back to the lot that the breeder originally released.

It is special in the sense that because it is pedigreed a farmer can be absolutely certain that it is the variety that is stated on the label and, because of the tie-in between the pedigreeing of seed and the grading of seed under the Seeds Act, the two go together so that you have the double protection of having genetic purity as well as having what we call mechanical purity — freedom from weed seeds plus high germination.

Would you tell us about the care taken in producing pedigreed seed?

Professor Klinck: The Canadian Seed Growers Association, as part of its pedigreeing program, has set up a number of regulations governing the production of pedigreed seed, and any farmer or seed grower who wants to have his seed registered or certified and labelled that way for market must adhere to the regulations that are laid down.

First, the seed that the farmer plants must be pedigreed seed itself. If he is going to produce certified seed from it, he must have planted either registered seed or foundation seed. If he is going to produce registered seed for sale, the material he planted must be foundation seed, or something superior to that. So the seed used is important.

The land used is important in that there are certain restrictions on the kind of field and what was on the field in the previous year. If the farmer grew feed barley — a non-pedigreed material — on the field last year, there is no way he can produce barley for pedigreed seed on that field this year because of the possibility of volunteer plants coming up from the previous crop. This principle applies right across the board and in perennial crops, or crops with hard seed which might lie in the ground for several years, it may be three to five years or even longer that that field has to be out of that crop before it can go back into a pure seed production of a crop of that same species.

Additionally, you have the isolation requirements, which in self-pollinated crops like barley, oats, and wheat are minimal. They require anywhere from 4 to 10 feet depending on the stage and varieties involved. Because there is no cross pollination between varieties, you only need to have enough physical isolation to prevent mechanical mixtures.

If you are dealing with cross-pollinated crops, whether pollinated by bees or by wind, then the distance between varieties must be sufficient to prevent cross pollination. In a crop like rye, for instance, it's a quarter of a mile. With corn it's something like 660 feet and so on. The principle here is to maintain purity. In certain of the perennial crops the number of years that a crop can be left in the original stand and still produce seed is restricted. Four or five years after the original seeding it must be torn up and

replanted to fresh seed. This is because of a certain amount of reseeding and therefore moving on into further generations of seed. In pedigreed seed there is what is known as the limited generation system where each step along the way from foundation to registered to certified can only be one year or one generation. If a farmer buys certified seed, he cannot normally produce certified seed from that. All that he can produce is either cow feed or commercial seed that would be sold with no name. So if a farmer wants to be a grower he must back up from there.

Is it necessary to buy pedigreed seed every year or is it possible to save seed for planting the following year?

Professor Klinck: I mentioned earlier that he can save his own seed if he has means of keeping it pure. Seed does not normally deteriorate unless it is through mixtures coming in from other varieties and this can happen in many ways on the farm, but generally speaking a farmer can save his own seed for planting the following year without running into difficulty. I would caution, however, that the average farmer shouldn't do this for more than two years because it is seldom that farm conditions are such that you can avoid getting some mixtures from either neighbours or from bringing feed grain in from the West. This material is put in one bin and the good seed in another and then, as an example, cats jump from one bin to the other and the mixing begins. The safest thing to do is to get certified seed every year or second year.

If a farmer uses his own seed, should he have it cleaned?

Professor Klinck: Definitely. There were seed growth surveys taken in the province a number of years ago to examine the quality of the seed that was being planted, and they showed that much of the seed had not been properly cleaned. An attempt was made to clean it apparently, but a lot of it still did not meet the minimum requirements for seed that would go to market.

The reason for cleaning, of course, is to get rid of trash that may plug up the seeder so that you get a less uniform stand and also to reduce, if possible, the number of weeds, particularly some of the weed species that are difficult to control by spraying. You sometimes hear the argument that with so many weed seeds in the soil already, what harm are a few more going to do? I don't go along with that philosophy. Seed certainly should be cleaned and cleaned early. One of the things that came out of the seed growth surveys was the fact that the farmer was frequently taking his seed to the cleaning plant much too late — even on the day that he and all his neighbours wanted to plant. If a good job is to be made, the cleaning plant operator must have time to do it. Seed should be taken to the mill as early as possible and certainly not later than the middle of March.

How about the treatment of seed before planting?

Professor Klinck: There are various thoughts on this. There is some evidence that seed treatment will give some protection to the

seed from certain soil-borne organisms. Certainly certain varieties — I'm talking about cereals now, because forage seeds are not normally treated — are susceptible to smut and they should be treated with a fungicide. A real problem that we run into is that some of the seed treatments are known to depress yields. If you think in terms of a smut infection of three or four per cent or a yield reduction of five per cent because of the treatment used to control the smut, then there is a question of whether you should treat or not. I realize that four per cent smut in the field looks terrible for a week or so, but if the alternative is to get rid of the smut by using a systemic fungicide which itself reduces yield, it has questionable value. A general recommendation is not to treat seed unless the smut infection is expected to be really bad, but I think it is good management to treat seed as a routine thing for some protection against soil-borne organisms.

How does the cost of pedigreed seed compare with what a neighbour might charge?

Professor Klinck: For just 15 to 25 cents a bushel more a farmer can get pedigreed seed which has a much higher quality. The pedigreed seed might be considered to be expensive in terms of the price of seed, but it is very, very cheap when you think in terms of the risks involved otherwise and the investment in seed is only a small part of the total cost in producing an acre of barley or whatever. What's an extra dollar or two for seed when you are talk-

ing about a crop that is going to yield 60 bushels to the acre at \$3 or \$4 a bushel or whatever the price happens to be. The investment in seed is relatively small and, therefore, the question doesn't really apply. It should never be asked. Is pedigreed seed too expensive? Of course it's not!

Is pedigreed seed production a major farm industry in Quebec?

Professor Klinck: It is not a major industry. I can't give you figures at the moment of the acreage, but the number of growers is something in the order of 250 to 300 compared with 1,500 to 2,000 in a province like Saskatchewan. Even Ontario has many more growers than Quebec. It's pretty small potatoes still in this province — there could be a lot more.

Land Drainage in Canada

by Professor R.S. Broughton
Department of Agricultural
Engineering

As can be seen from Figure 1 and the data in Table I, the area in Canada with a soil and climate suitable for crop or cattle farming is much less than 10 per cent of the land mass in all provinces, except Alberta, Saskatchewan, and Prince Edward Island.

Drainage improvements have been essential prerequisites for crop production on more than half of the crop land in the cool, humid climatic regions in Canada. That is, all the farming areas shown on Figure 1, except in Manitoba, Saskatchewan, Alberta and the interior valleys of British Columbia where a sub-humid or semi-arid climate occurs. In the drier areas some drainage improvements have been undertaken, and more can be expected in the future as pressure for food production increases.

Surface drainage improvements began to be undertaken as soon as serious settlement and cultivation began in the farming areas of Canada, east of the Great Lakes from approximately 1700 and more vigorously after about 1830.

Legislation pertinent to drainage of farm lands is a responsibility of the provinces in Canada's governmental structure. Drainage needs, laws, and methods of undertaking drainage work differ slightly from province to province.

Prior to 1900 some rivers and streams were deepened to provide better outlet for drainage water from farm lands. Shallow ditches were dug extensively by human

and animal power to improve field drainage. Dikes were constructed to protect lands from high tides around the Bay of Fundy coast of New Brunswick and Nova Scotia and along the south shore of the St. Lawrence Estuary in Quebec.

The need for construction of additional drainage ditches and cleaning or deepening of former ditches and rivers has continued through the twentieth century, as more food has been needed to feed an increasing Canadian population as well as to provide some food for export, and to develop new land to replace land being lost to expanding cities.

Subsurface drainage with tiles, stone or wooden drains was introduced with hand digging in the 19th century. The prospect for much increased subsurface drainage with tiles was ushered in with the importation to Ontario in 1907 of wheel type Buckeye ditching machines and the development of subsurface drainage experiments and drainage system design capabilities at the Ontario Agricultural College.

Even though the need for subsurface drainage on farms in Quebec, New Brunswick, Nova

Scotia, Prince Edward Island, Newfoundland and near the British Columbia coast was great because of higher rainfalls and a shorter growing season than Ontario, subsurface drainage moved ahead most rapidly in southwestern Ontario. The more rapid acceptance and installation of subsurface drains in southwestern Ontario was probably due primarily to (1) the suitability of the climate for higher valued arable crops which were most responsive to drainage improvements, and (2) the resultant greater capability of the farmers to pay for the drainage improvement work.

In comparing drainage work in Canada with that in other countries it is well to recognize that the basic farm unit is the family-owned and operated farm. The demand for drainage improvements has come from individual land-owning farmers. Stimulation has been provided by difficult planting and poor harvests in wet years and by knowledge extended by government officers and journalists that significant drainage improvements are technically and financially possible.

Though the degree and pattern of assistance varies from province

TABLE I. RELATIVE MAGNITUDE OF LAND SUITABLE FOR FARMING AND FARM LANDS NEEDING DRAINAGE IMPROVEMENT AFTER IRWIN AND AYERS (1970).

| Province | Total Land Area (hectares) | Improved area of Commercial Farms (hectares) | Estimated Areas Needing Drainage Improvement (hectares) |
|---------------------------|-------------------------------|--|---|
| Newfoundland..... | 37,048,542 | 3,659 | 2,023 |
| Prince Edward Island..... | 566,058 | 164,199 | 10,117 |
| Nova Scotia..... | 5,284,101 | 106,765 | 50,585 |
| New Brunswick..... | 7,209,243 | 149,699 | 50,585 |
| Quebec..... | 135,679,326 | 1,995,588 | 1,214,058 |
| Ontario..... | 89,119,556 | 3,884,347 | 1,618,745 |
| Manitoba..... | 54,849,557 | 4,458,445 | 687,966 |
| Saskatchewan..... | 57,026,964 | 17,115,583 | 809,372 |
| Alberta..... | 64,475,830 | 9,837,391 | 809,372 |
| British Columbia..... | 93,052,977 | 1,643,555 | 809,372 |

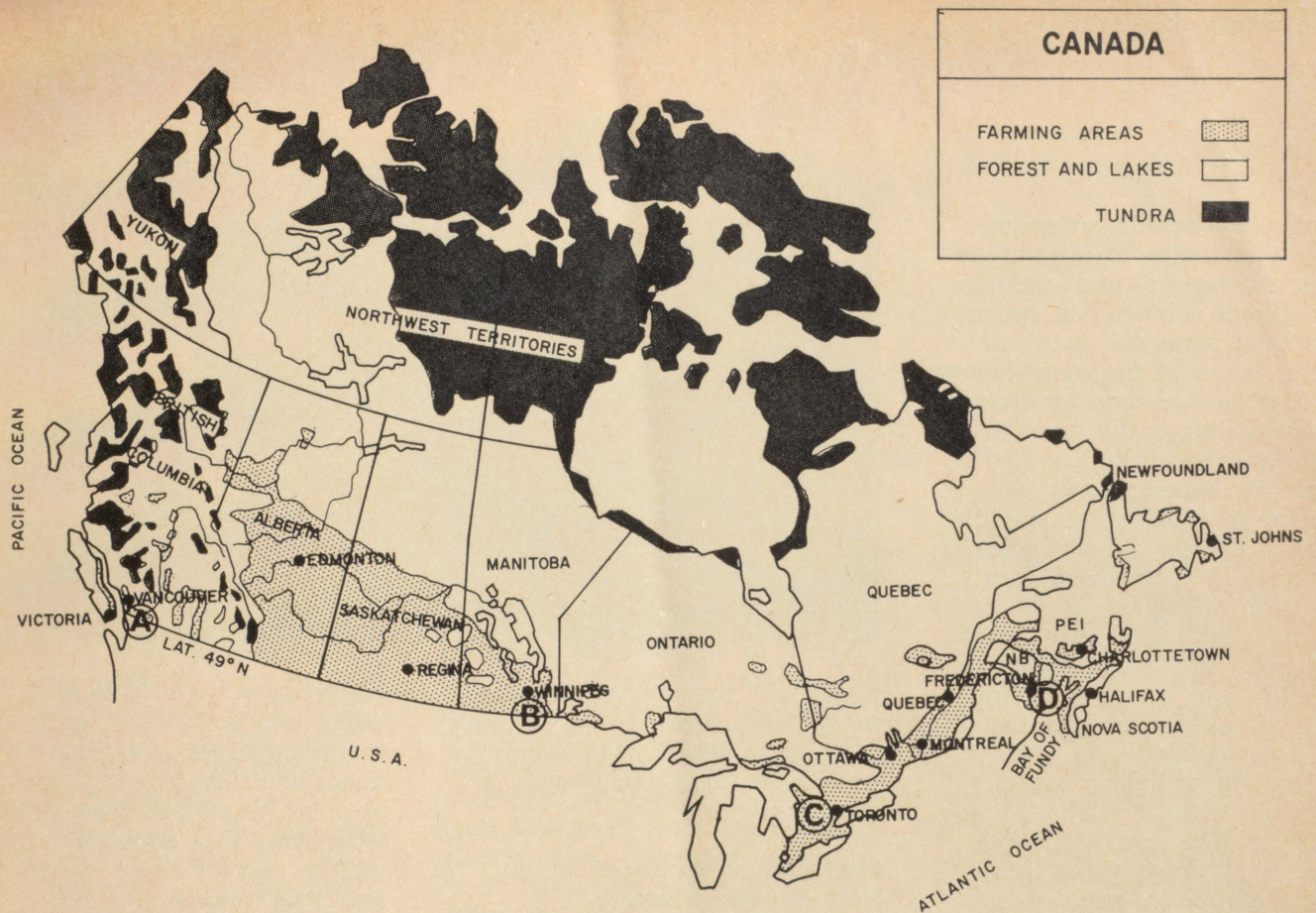


Figure 1.

to province, provincial governments have provided assistance through (1) professional planning services and (2) through paying for part of the cost of the drainage works. Government assistance programs are prompted by realizations such as (1) Quebec, New Brunswick, Nova Scotia, and Newfoundland produce less food than they consume, but food production could be greatly increased in these provinces by drainage improvements to more of the potentially fertile lands suffering from excess water, April (1967), Higgins (1973), (2) watercourse enlargement to provide outlet for farm, village, and city drainage needs to be planned on a watershed basis rather than on an individual landholding basis, and (3) better crop production produces social and economic benefits for the whole province and country.

Drainage Achievements in the Quarter Century, 1949-1974

In the recent 25 years, 1949-1974, steady progress has been achieved with new outlet ditch construction, cleaning and deepening of

former ditches, and subsurface drainage installations proceeding. It is not possible in this article to give full numerical detail for the whole country. However, some indication of the state of drainage work will be provided.

A. Outlet Ditch and Watercourse Construction

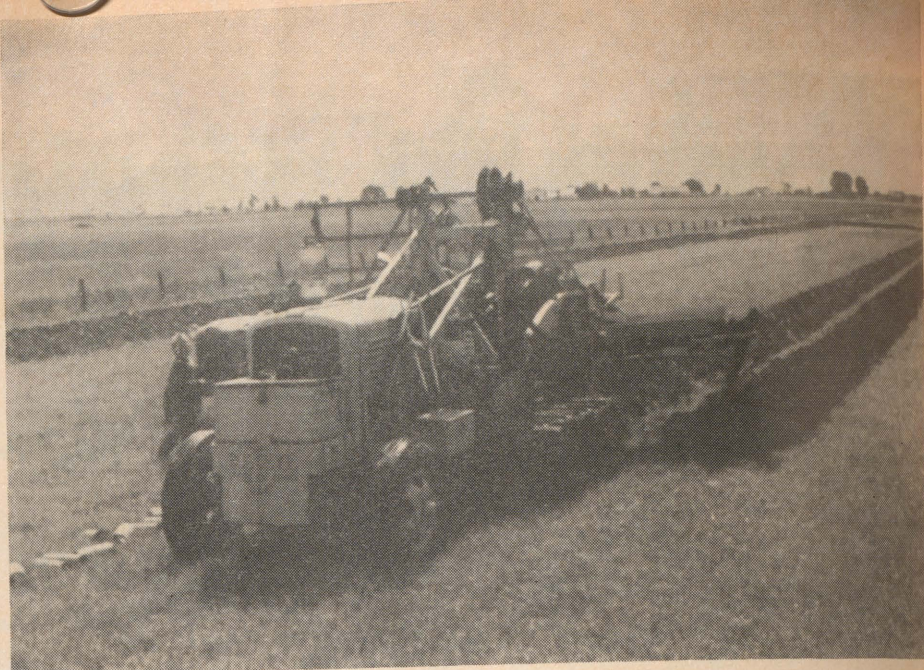
Watercourses have been deepened, enlarged, and straightened and ditches dug to provide capacity for excess surface runoff and depth for outlets for subsurface drains at a steady pace during this quarter century. Quebec leads with an average of about 1300 km of new ditches, or ditch cleaning and deepening per year. Ontario has dug about 170 km of ditches and watercourses per year on the average. The other provinces have dug lesser distances. Outlet ditch excavation has been done primarily by drag line. Dynamite blasting is done in rock and for initial channel establishment in organic soils. In Quebec excess soil from ditch excavation is normally allowed to rest in a spoil bank adjacent to the ditch for one year before spreading. During

this time the combination of freezing and thawing action over winter and drying in summer causes the soil to develop a consistency for easier spreading and incorporation into the adjacent land. A manufacturer in Quebec has produced drag digger blades for the back of bulldozers which do an efficient and good quality job of digging, cleaning and spreading soil from smaller outlet ditches and farm field ditches.

B. Subsurface Drainage

The rates of installation of subsurface drains for the 10 years, 1964-1973, are given in Table II. From these data it can be seen that installation rates in Ontario rose rapidly prior to 1964 and have levelled off somewhat in recent years at approximately 19,500 km or 36,000 ha per year. Installations in Quebec have risen rapidly since 1964 and are still rising. Installations in the other provinces have been rising only slowly, but may be expected to continue to rise.

The very substantial rates of annual installation of subsurface drains and rates of increase in installations achieved in recent years have been due to many factors. Some of the main factors are: 1. farmer demand for drainage improvements; 2. the need to reduce imports of high priced grains; 3. developments of varieties of maize that would mature in shorter growing seasons; 4. demand for increased local production of higher protein crops such as alfalfa and bean crops which are really only practical on land with good drainage; 5. the desire of governments to assist with drainage improvements; 6. development of higher capacity trenching machines in the United States and The Netherlands; 7. research at universities into aspects of performance of subsurface drainage systems and development of design procedures to provide more economical yet physically effective drainage systems; 8. the training at universities of larger numbers of agricultural engineers and soil scientists competent in drainage planning, who have been employed by government agencies, consulting firms, equipment manufacturers and suppliers, and contractors; 9. more persons becoming interested in developing a drainage contracting business; 10. introduction of labour-saving devices to move tile at the factories, on the trucks, and on the farms; 11. the development by universities and provincial government extension officers of short courses for drainage contractors; 12. the development of drainage contractors associations for self help and information exchange; 13. the development of perforated corrugated plastic drain tubing, first significant installations in Canada in 1968; 14. the development of the trenchless drainlaying plough in several countries and manufacture of one kind in Canada since 1971; 15. the development of the laser method of controlling the grade of trenchers and trenchless drainlaying machines.



Some of the above developments have been special to parts of Canada; others have been companion to developments in other countries.

Problems to be Faced in the Next Quarter Century

A. Watercourses and Outlet Ditches

While many ditches and watercourses have been dug and perhaps 1800 km of outlet ditches are dug each year (including new ditches and cleaning of former ditches), requests from farmers for ditch and watercourse excavation continue to pile up. Some of the items needing better solutions in the next quarter century are identified below:

1. Outlet ditches and watercourses appear to need cleaning, deepening, sediment removal, or other significant maintenance about once in 10 years, on the average. The costs for this work on a country-wide basis are very large. There is a need for development and use of new machines for more economical ditch cleaning and weed control.

2. Where the financial resources available are only sufficient to dig or clean a few per cent of the outlet ditches or watercourses requested, more rational and sociologically and ecologically acceptable approaches are needed for deciding which ditches or

watercourses are to be dug. If costs and weights of large diameter concrete pipes can be kept down while maintaining adequate strength to support farm traffic, it is likely that subsurface drains will be carried longer distances and thus reduce the density of outlet ditches required with consequent savings in ditch maintenance, nuisance, and land lost from cultivation.

B. Surface Drainage

Lest we become complacent by thinking that rates of installation of subsurface drains of 30,000 km/year for the whole country are pretty good, we must bear in mind some of the following points. 1) In Ontario alone, which has the greatest area (about 810,000 ha) already drained, approximately 1,610,000 ha of good and fair crop land would benefit from installation of subsurface drains. Some of the area already drained requires additional subsurface drains. With installation rates of 19,500 km/yr and 0.5 km/ha it will take 41 years to install subsurface drains on the remaining 1,610,000 ha. 2) April (1967) and Jutras (1967) show that about 1,214,000 hectares, or about 60 per cent of the cultivable land in Quebec needs subsurface drainage improvement for its crop production potential to be realized. With installation rates of 12,200 km/year and 0.5 km/ha, 50 years will be required for these installations. 3) In Prince Edward Island

109,000 acres of fair and good land would benefit from subsurface drainage, and there is not one subsurface drainage trenching machine on the Island on a continuing basis. 4) Nova Scotia and New Brunswick each have about 50,000 ha needing subsurface drains. At installation rates of 150 km/year and 0.5 km/ha it will take about 166 years for the needed drains. 5) Subsurface drainage work has only recently been started in Manitoba. Intensively farmed areas of river valley lands could benefit significantly from surface and subsurface drainage improvements. 6) The areas needing drainage improvement in Manitoba, Saskatchewan, and Alberta, as indicated in Table I are very large and very little drainage work has yet been done in these provinces. 7) As more irrigated

lands are developed in Saskatchewan, Alberta, and British Columbia the drainage needs for those lands will need to be more carefully established. 8) Since the area available for cultivation in British Columbia is less than one per cent of the area of the province and because of the mountainous terrain, the fertile land is located primarily in moist river valleys, subsurface drainage is an important prerequisite to intensive crop production on much of this land. 9) At an installation rate of 30,000 km/yr and 0.5 km/ha, 60,000 ha can be drained each year. Yet, we are concurrently losing about 40,000 ha of good farm land per year to urbanization with current unplanned sprawl of enlargement of cities and towns. Clearly, we must find ways of encouraging future urban development to take place

on the large areas which are not suited to farming for food production, but which have characteristics which could be beneficial to urban uses. 10) We have the contractors, men, and machine capabilities to install perhaps 50 per cent more drain tile and plastic tube than that produced in 1974. While the supply of plastic raw materials may be improved in the future the competition from uses other than farm drainage will be stiff, and it is likely that plastic drain tube in sizes of larger than 10 cm diameter will increase in price in the future. There is a need to use plastic materials more efficiently and conservatively to cut down relative costs by making and using tubing of approximately 6 and 8 cm diameter for the majority of subsurface drain laterals. This will require some changes

TABLE II. APPROXIMATE EXTENT OF SUBSURFACE DRAINS INSTALLED IN CANADA.

| Province | Length Area | Before 1964 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | Total |
|----------------------------|-------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------|
| Newfoundland ¹ | km | — | — | — | — | — | — | — | — | — | — | — | — |
| | ha | — | — | — | — | — | — | — | — | — | — | — | — |
| Prince Edward Island | km | — | — | — | — | — | — | — | — | — | 5 | 10 | 15 |
| | ha | — | — | — | — | — | — | — | — | — | 12 | 22 | 34 |
| Nova Scotia ² | km | 492 | 45 | 43 | 80 | 87 | 148 | 161 | 152 | 156 | 147 | 201 | 1,712 |
| | ha | 1,968 | 180 | 172 | 320 | 348 | 592 | 356 | 337 | 380 | 359 | 490 | 5,502 |
| New Brunswick ³ | km | 1,162 | 98 | 136 | 138 | 140 | 149 | 127 | 125 | 124 | 122 | 170 | 2,491 |
| | ha | 2,700 | 218 | 320 | 324 | 324 | 324 | 281 | 278 | 276 | 271 | 378 | 5,694 |
| Quebec | km | 2,233 | 860 | 1,042 | 1,562 | 1,889 | 2,718 | 3,448 | 4,674 | 6,556 | 7,467 | 11,582 | 44,031 |
| | ha | 10,496 | 2,056 | 1,962 | 2,794 | 3,503 | 4,838 | 5,875 | 7,791 | 11,174 | 13,718 | 21,974 | 86,182 |
| Ontario ⁴ | km | 429,141 | 15,240 | 15,850 | 16,764 | 17,678 | 19,507 | 19,202 | 19,812 | 19,812 | 19,812 | 19,812 | 612,630 |
| | ha | 809,700 | 28,328 | 30,351 | 31,566 | 33,589 | 36,826 | 36,580 | 37,742 | 37,742 | 37,742 | 37,742 | 1,157,908 |
| Manitoba | km | — | — | — | — | — | — | ? | ? | ? | 15 | ? | 15 |
| | ha | — | — | — | — | — | — | — | — | — | — | — | — |
| Saskatchewan ⁵ | km | — | — | — | — | — | 12 | ? | ? | ? | ? | ? | 12 |
| | ha | — | — | — | — | — | — | — | — | — | — | — | — |
| Alberta ⁶ | km | ? | 7 | 5 | 2 | 8 | 1 | ? | ? | ? | ? | ? | 23 |
| | ha | ? | — | — | — | — | — | — | — | — | — | — | — |
| British Columbia | km | ? | 107 | 153 | 122 | 98 | 139 | 152 | 152 | 152 | 152 | 152 | 1,379 |
| | ha | ? | 395 | 554 | 437 | 279 | 344 | 337 | 337 | 337 | 337 | 337 | 3,694 |
| Canada | km | 433,028 | 16,357 | 17,229 | 18,668 | 19,900 | 22,674 | 23,090 | 24,915 | 26,800 | 27,720 | 31,927 | 662,308 |
| | ha | 824,864 | 31,177 | 33,359 | 35,441 | 38,043 | 42,924 | 43,430 | 46,485 | 49,909 | 52,439 | 60,943 | 1,259,014 |

1. No subsurface drainage program.

2. Mainly random systems.

3. Acreages based on 0.45 km of subsurface drains per ha. Mainly random systems.

4. Acreages based on 0.525 km of subsurface drains per ha.

5. For canal seepage control to prevent damage to adjacent agricultural lands.

6. All drains are interceptors. Bow River Project (PFRA) and private works are not included.

in current design styles and the development of new design criteria and charts. Since clay is not in short supply, but drain tile is currently losing in competition to bricks for plant production capacity, perhaps some new approaches can be found to develop clay tile to serve more economically in the future. Perhaps other new drain tube materials can be found. 11) Effective filters, effectively installed, are needed for the drain tubes for the large acreages of fine sandy loam soils needing drainage improvement. 12) Soil and climate characteristics need to be taken into account more effectively in drainage design work. While soil hydraulic conductivity is now measured or estimated as a precursor to the design of perhaps 30 per cent of the drainage systems in Canada, other characteristics such as farm machine and animal traffic capacity need to be identified in useable ways. Design outflow rates for subsurface drains might be more effectively related to climatic and soil characteristics than at present. 13) Soils which have a potential for blocking drain tubes with iron formations need to be identified.

C. On Farm Surface Drainage

Over the generations of farm development in Canada, farmers have expended very great efforts in surface drainage improvement. The costs of this work are hidden because the farmers have done much of it themselves without hiring contractors.

Subsurface and surface drainage work are seen to be complementary. By reducing the number of pondings in fields through land

smoothing and forming, or surface ditching, the amount of water which must soak through the soil to subsurface drains is reduced and fields can be worked sooner in the spring or after rains. Also the leaching of nutrients from the soil is reduced if excess snowmelt water can flow off over the surface rather than passing through the soil to drain tubes.

It is expected that there will be much greater use of earthmoving equipment and land smoothing equipment in the next quarter century to fill in shallow depressions and to grade fields for better surface drainage. Equipment improvements and planning guidelines are required.

D. Dikes and Pumps

About 300 km of dikes are currently being planned to protect lands from high lake levels and wave damage around the shores of Lake St. Claire and Lake Erie. It is expected that dikes will be used to a greater extent in the future to protect areas from 10 hectares to 5000 hectares, particularly organic soil areas and flat lands near lake shores and in river valleys. Concurrently, an increased use of pumps to remove excess surface and subsurface water from diked areas can be expected. There is a need for collection of local hydrologic data to improve the accuracy of hydrologic design of pumping stations and dikes in this region. Pumping systems with better reliability and which suffer a minimum of winter damage need to be developed.

Relationship to the Economy of the Country

Drainage work has a significant, though not overwhelming, position in the economy of eastern Canada and the river valleys and delta lands in British Columbia — the regions with the cool, moist climate and the flat lands. Drainage work has been a primary requisite to food production, road construction, and town construction in the Ottawa and Saint Lawrence Lowlands, and other flat land areas in the country. Drainage work represents only a tiny part of the Gross National Product. The increase in farm drainage work in the past 25 years has resulted in new industries making drainage materials and equipment and the employment of several thousand additional persons in fabricating, transporting, installing drainage materials, and in designing and constructing drainage works.

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Macdonald Reports

School of Food Science

Dr. Edmund Stefan Idziak has been appointed Director of the School of Food Science. He continues to be associated with the Department of Microbiology with regard to teaching and research in the area of Food Microbiology.

Professor Helen Neilson, former Director of the School of Food Science, is on a one-year sabbatical leave.

Dr. Delores Shymko has been appointed Assistant Professor in the School of Food Science teaching in the area of Family Studies. Dr. Shymko was born in Alberta and received her B. A. English (1959) and B. Ed. (1961) from the University of Alberta, her M. Ed. from the University of Calgary (1969) and her Ph. D. from the University of Toronto in 1974. She has worked as a teacher in secondary schools and has wide experience in counselling students. Her research interests are in the areas of Human and Developmental Psychology, Family Life Education, Sex Education, as well as cross-cultural research.

Entomology Department

Dr. Robin Kenny Stewart has been appointed new Chairman of the Department of Entomology. Dr. Stewart was born and educated in Scotland and received his Ph. D. degree from Glasgow University in 1966. He joined the Department the same year. His current research activities include the effect of physical factors on insect populations, pest damage

potentials and levels. He teaches ecology and environmental biology. He is also a consultant on the ecological implications of hydro dam and gas pipeline developments in Northern Canada and in Guyana.

Dr. Frank O. Morrison retired as Chairman and is remaining in the Department on a half-time basis. He has been associated with Macdonald College since 1937. Dr. Morrison will continue with his teaching and many research projects.

Back on Campus

Dr. Roger Knowles has returned to the Department of Microbiology after a one-year sabbatical leave in France.

Dr. B. P. Warkentin, who has been on "on campus" sabbatical leave to study environment work in industry and government, has resumed his duties in the Department of Renewable Resources.

Professor Alan Godfrey of McGill's English Department has resumed his teaching duties on the Macdonald Campus after a year's sabbatical leave for further studies.

Department of Agronomy

Dr. Howard A. Steppler needs no introduction as Chairman of the Department of Agronomy as he has been active on the Macdonald Campus since 1946. As well as being Chairman, he is currently teaching courses in the B.Sc. program at Macdonald and at McGill and directing the studies

of post-graduate students in forage crops.

Professor H. R. Klinck, former Chairman of the Agronomy Department, is on sabbatical leave. He is spending the coming 12 months studying, observing, and writing at the Plant Breeding Institute in Aberystwyth, Wales.

Professor Alan K. Watson has come to Macdonald to continue the weed research program where Walker Riley left off. He was born in Vernon, B.C. and grew up on a farm in North Okanagan. He received his B.Sc. (Agr.) and M.S. from the University of British Columbia in 1970 and 1972 respectively. He started his Ph.D. program at the University of Saskatchewan, where he completed his Ph.D. research in the biological control of weeds at Agriculture Canada, Regina Research Station. At Macdonald, Professor Watson is teaching a course in Weed Control to students in the B.Sc. program and also in the Diploma Program. He will also be directing the studies of post-graduate students in Weed Control.

Professor Patricia (Martin) De Leon was born in Jamaica. She obtained her B.Sc. from the University of the West Indies in 1967 and her M.Sc. in 1969, majoring in cytogenetics in the Faculty of Medicine. In 1969 Professor De Leon came to Canada and obtained her Ph.D. degree (Department of Microscopic Anatomy) from the University of Western Ontario. At Macdonald she is responsible for three genetics course in the B.Sc. program.

The Family

Farm

Published in the interests
of the farmers of the province
by the Quebec Department of
Agriculture.

Sugar Beets in Quebec

by J. B. Roy, Agronome,
Information Division

The first attempts to grow sugar beets in Quebec date back to 1874 and the first ventures at setting up a refinery were made a few years later. After 70 years of tentative efforts, these initiatives resulted in the building of the St-Hilaire beet sugar refinery which started operations in 1944. In 1974 this refinery milled 82,320 tons of beets supplied by 312 growers and produced 21 million pounds of sugar, 5,500 tons of beet pulp, and 3,300 tons of molasses for a total gross return of \$2.8 million — the equivalent of \$9,166 per producing farm or \$500 worth of beets per acre.

Record sugar prices in 1974 gave the Quebec refinery one of its best financial years and enabled it to pay its producers well. At this time, it may therefore be of some interest to review the history of sugar beet growing and producing in Quebec.

Origins

In 1744 the German Chemist, André Sigismond Marggraff (1709-1782), the discoverer of phosphoric acid and manganese, first succeeded in extracting sugar from beets. This discovery was not followed up. However, in tracing the origin of the sugar beet industry in Europe, E. A. Barnard, Director of Agriculture for Quebec from 1876 to 1889, mentions Charles-François Achard as the pioneer of this industry who, in

1802, refused an offer of \$100,000 from England to state in writing that he had been mistaken in his findings concerning sugar beets. About that time, there was talk of investing \$200,000 to set up a refinery with a milling capacity of 110 tons a day.

It was not till 1806 that, following the "continental blockade" decreed by Napoleon to ruin Britain's economy and shipping, the possibilities of using beets to make sugar industrially began to be seriously explored. In the following years, this crop was to prove a veritable gold mine for the farmers of Belgium and northern France. Today sugar beets occupy 300,000 to 400,000 hectares in France. Though French growers intentionally limit expansion of the area devoted to this crop, it is still sufficient for France, with imports of raw cane sugar from overseas, to be a sugar exporter.

Canada started to become interested in sugar beet growing in 1874. Quebec then comes into the picture. Trials were made by members of the Quebec Agricultural Society and by a number of farmers in the St-Jean and Richelieu district. In the fall samples were sent to France. The tests gave encouraging results and the Quebec government stepped in and passed an act whereby the first beet sugar extracting factory to be set up in the province was to receive a grant of \$5,000 a year for five years.

The trials were continued in 1875 and discussions were begun with a French firm which, at that time,

was already considering setting up a refinery in Canada. Quebec sent a representative to France and Belgium who entered into negotiations with financiers interested in the sugar beet industry. On his return, he reported that three big sugar manufacturers of Brussels were prepared to deal with the government and to invest \$200,000 in the industry. In his annual report, the assistant commissioner for agriculture, Mr. Siméon Lesage, spoke of the revolutionary effect that the establishment of this industry would have on agriculture and of the farmers' interest in the proposal.

On September 9th of the same year (1875), the Comte d'Archevêque wrote in a letter to Mr. Lesage that a Belgian company had been formed to operate a factory in Canada and was asking the government to raise its subsidy of \$5,000 a year for five years to \$7,000 for 10 years. This request was granted in the following year through an amendment by the House to the act (38 Victoria). By an order in council of April 21, 1876, the government was authorized to spend \$1,000 to pay the cost of sugar beet trials. Through the agency of members, it distributed 500 pounds of sugar beet seed.

These trials were carried out in some 40 counties and an analysis of their results made in 1877 revealed very good results. In his report, the Director of Agriculture, E. A. Barnard, spoke at length about the study he had made of the question after a visit to Europe. He said he was convinced that Quebec farmers could make as big a success of beet growing as

their European counterparts because Quebec beets had a higher sugar content than those of the old countries.

There were no striking developments in 1877 except that, encouraged by the government's attitude, the promoters redoubled their efforts to launch the beet sugar industry. There was rivalry between the financiers of that time to be the first to take advantage of the government offer. In 1878 the first company was incorporated with an authorized capital of \$500,000. It was called the Sugar Beet Company of the Province of Quebec and its head office was at Saint Pie, Bagot County. However, it never got beyond the incorporation stage.

In 1878 two other companies were in process of formation. One was to operate at Quebec, the other at St-Hyacinthe. These two companies did not progress beyond the planning stage. Things seem to have been at a standstill in 1879, the only document of any interest found for that year being a letter of the "Compagnie Five-Lille" of Paris concerning the building of a factory. (In 1939, this same firm said that it was prepared to build a factory at St-Hilaire, but it was prevented from doing so by the war.) We may sum up the situation in 1880 by saying that the impetus had been given and the industry seemed to be about to gain a firm foothold.

The Impetus Given

In 1880 two companies were incorporated and received their letters patent. The first was "La Compagnie de Sucre de Betterave

de Québec" located at West Farnham and the other was "The Pioneer Beet Root Sugar Company" at Coaticook. Another two companies made their appearance in 1881: "La Compagnie de Sucre de Betterave de la Vallée du Richelieu" which obtained its letters patent on the 14th of July, and "L'Union Franco-Canadienne" (also known as "Les Sucreries du Canada") which was set up at Berthier.

Disregarding the Companies de Sucre de Betterave de la Vallée du Richelieu with partnership funds of \$150,000 in 1,500 hundred-dollar shares, of whose operations we can find no trace, we turn to the activities of the three enterprises which establish themselves respectively at Farnham, Berthier and Coaticook.

Farnham

The "Compagnie de Sucre de Betterave du Quebec" set up its factory at Farnham. Antoine Casavant was manager with a salary of \$1,200 a year. An engineer, John Sparrow, was engaged to install machinery which was purchased in Germany. The milling capacity of the plant was 200 tons a day. On April 29, 1880, the company obtained the government subsidy of \$7,000 a year for 10 years and exemption from excise duty for eight years.

Production was begun in 1881. The factory opened its doors on December 15 and received 10,000 tons of beets. It processed about 125 tons a day of this and lost about 2,000 tons through decay at the factory.

The following year, thanks to the government subsidy, it leased 1,000 arpents of land to grow beets to supplement those delivered by the farmers under contract but the crop yielded only 3,800 tons of beets for milling.

On August 15, 1882, the government passed an act to promote sugar beet growing through the granting of a production premium of 75 cents a ton but the situation did not improve and, the next year, the factory received only 2,200 tons of beets which yielded 353,000 pounds of sugar and 70,000 pounds of molasses. Owing to its financial difficulties, the factory then shut down but in 1890 a French syndicate including Baron Raymond Seillière, the Princess de Sagan and Messrs Alfred Musy, Lefebvre and Dupire leased the factory and reopened it. The syndicate lost 250,000 francs in its first year of operation but then fortune smiled and, the following year, the factory received 16,391 tons of beets and distributed \$8,195.59 in bonuses to its growers on the basis of 50 cents a ton. The beets were paid for at the rate of \$4.50 a ton delivered at the factory. The next year beet production rose to 12,828 tons.

In 1893 the death of the president of the French syndicate resulted in the abandoning of the Farnham factory, which closed down for good this time.

Berthier

The syndicate then entered into an agreement with the owners of the factory at Berthier in order to continue its operations there. The Berthier factory had also

been built during 1880-81 by a group of French financiers called "L'Union franco-canadienne" and also known as "Les Sucrieries du Canada".

This factory opened its doors on December 15, 1881 and, in that year, received about 2,000 tons of beets. It continued to struggle along until 1883 but, by then, deliveries had declined to 1,400 tons of beets and it had to suspend operations. In 1886 the factory was sold by auction to a Montreal group which resumed operations in 1888 under the name of "La Sucrierie de Betterave de Berthier"; but this turned out to be a flash in the pan and the operations were not continued after 1888.

In 1893 an amalgamation of the French syndicate of Farnham with the Montreal group to operate the Berthier factory appeared to have finally put the beet sugar industry on a firm footing.

From 14,470 tons in this first year, sugar beet deliveries to the factory reached 20,028 tons in 1895 but the financing ran into difficulties because the Dominion Government had just reduced the premium it was paying from two cents to one cent per pound of sugar. The failure of the Banque du Peuple put the finishing touch to the company's collapse and, the following year, the machinery in the factories at Farnham, Berthier, and Coaticook was sold to American interests and shipped to the United States.

Coaticook

The Pioneer Beet Root Sugar Com-

pany was incorporated on July 15, 1880 with an authorized capital of \$150,000 and located in Coaticook. Machinery was bought in Germany with a view to milling 200 tons of beets a day but, in practice, the rate of processing never exceeded 50 tons a day.

The factory was the first one to open during the first half of December 1881. It apparently received only about 500 tons of beets that first year but deliveries seem to have reached 10,000 tons the following year. In 1883 they were down to 7,000 tons and the factory closed down.

After this series of setbacks, the beet sugar industry sank into oblivion in Quebec and interest in it did not revive until 1936.

Causes of fumbings and failures

The initial period of the history of the sugar beet industry in Quebec thus ended in the failure of a number of attempts to introduce the crop. To what were these setbacks due? There were many causes, including the low milling capacity of the factories, the losses sustained in storing the beets, production too small to pay overhead costs, lack of financing, the failure of the Banque du Peuple which had strongly supported the first steps of the sugar beet industry, and the reduction of the Canadian government's premium on refined sugar by one cent a pound. Promoters seem to have counted too much on government grants to make the industry viable.

"In spite of certain misunderstandings about the possibly self-seeking role of some deputies in the organization of companies," later

wrote Mr. André Auger who was behind the revival of the sugar beet industry in the forties, "one must recognize the very laudable efforts of the government to get this industry on its feet for the benefit of the farmers. The numerous pieces of legislation passed concerning the sugar beet industry and the subsidies granted, both for the growing of beets and the building of refineries, are irrefutable proof of the government's interest in this matter."

The period from 1897 to 1935 was one of tentative efforts. Until 1914, the sugar beet industry remained in obscurity, apparently having difficulty in recovering from the failure of the first three refineries. Between 1914 and 1935 the matter crops up again. Sugar beets were mentioned in newspapers and parliamentary debates, and the Ecole des Hautes Etudes Commerciales in Montreal and the agriculture colleges asked the government to help sugar beet growing become established.

Some efforts were made in connection with the crop. In 1933 and 1934 the member for Montmagny travelled at government expense to find out more about it. In 1934 an agriculturalist employed by the province was granted a bursary to study sugar beet growing — which indicates a revival of interest in the industry by the authorities of the Quebec Department of Agriculture. These steps were harbingers of the rebirth of the industry in Quebec.

In the fall of 1934 the head of the Department's agricultural economics division went to Ontario and Michigan, visiting several refineries and gathering impor-

tant information about their financing which was to have some bearing on future developments here.

Experimentation

The period from 1936 to 1940 was marked by experimentation. At the start of this period the Quebec Department of Agriculture decided to undertake trials in 17 counties on a total of 282 one-acre fields. The supervisor's report on these trials shows that yields, by parishes, ranged from 11.14 to 16.69 tons of beets per acre with an average close to 13 tons and an average sugar content of 16 per cent.

Ten carloads of beets were shipped to Chatham, Ontario, where they yielded 14.8 per cent sugar. These results were most encouraging indicating, as they did, that Quebec's soils and climate are very suitable for sugar beet growing. The yields compared very favourably with those obtained at that time in the United States, Ontario and Alberta, namely 10.9, 9.5, and 12 tons to the acre.

The trials in 1936 entailed expenditures amounting to \$9,398 for the purchase of machinery, fertilizer, seed, the cost of shipping beets to Chatham, and paying a subsidy of \$15 an acre. In addition, there were the wages and travelling expenses of seven sugar beet workers from Chatham who were engaged by the Department to teach farmers how to grow the crop.

Mr. André Auger, whom we have already quoted, says that there were no government expenditures connected with sugar beets in

1937 or 1938 but that discussions were begun with a French company called Five-Lille with a view to setting up a refinery. In 1939 the government gave \$2,000 to Mr. Louis Pasquier to make a full inquiry into the chances of success for a refinery. Mr. Pasquier's findings led him to strongly advise the government to invest the capital required to build a refinery. The location he himself recommended for the factory was the eventual site — St-Hilaire.

In September 1939 war broke out and, for the time being, attention was diverted from beet growing to the war effort which was to be made on the farm front. Nevertheless, in 1940, some experiments in sugar beet growing were conducted on the St-Hyacinthe Dairy School's farm and at MacDonald College. In January 1941 the Quebec government sent representatives to the annual meeting of Beet Sugar Technologists at Detroit where they made the acquaintance of persons interested in growing the crop and also of a company promoter.

The promoter came to Montreal and interested a number of people in the formation of an enterprise which was to be called the "Compagnée de Betterave Richelieu". The company received its letters patent on April 2, 1941 but, in June, it had still not yet managed to attract shareholders and the hopes inspired by this enterprise collapsed. The government then decided to undertake the building of a refinery to be sold eventually to the growers.

The Saint-Hilaire Refinery

On September 25, 1941 the Quebec Minister of Agriculture was authorized by order in council to establish and maintain a factory for the extraction of beet sugar and to build a site for the purpose. A few days before, the agricultural department had bought the machinery and equipment from the beet sugar plant of the Rock County Sugar Company of Janesville, Wisconsin. This purchase, incidentally, gave rise to a memorable debate in the Legislative Assembly.

On November 6, 1941 an order in council authorized an expenditure of \$350,000 for the establishment of a beet sugar factory, and the Department of Agriculture at once proceeded to buy a site at St-Hilaire and to build the refinery and storages.

It was not, however, until June 23, 1943 that the government passed an act entitled "An Act respecting the establishment of a beet sugar factory at St. Hilaire" (Statutes of Quebec, 1943, Chapter 23). The preamble to this act is worth quoting.

"Whereas, in order to promote the cultivation of sugar beets, the Department of Agriculture has undertaken the construction of a beet-sugar factory and has acquired the necessary machinery and equipment;

"Whereas, with a view to putting such plant in operation at an early date, it is expedient to provide for the formation of a corporation to administer it until such time as the operation thereof can be handed over to a cooperative;"

By virtue of the said act, the Lieutenant-Governor in Council might authorize the issuing of letters patent to create a corporation to be called the "Quebec Sugar Refinery", in English, and the "Raffinerie de sucre de Québec", in French. The act also stipulated the administrative structures of the new corporation and enabled the Lieutenant-Governor in Council to authorize the provincial treasurer to "guarantee payment in principal and interest of loans contracted by the corporation, such principal not to exceed the sum of two million dollars." In consequence, letters patent constituting the corporation were issued on July 4, 1943 and Order in Council No. 1771 of the same date authorized the provincial treasurer to advance the corporation one million dollars to start operating. By 1944 the Quebec Sugar Refinery was in operation.

From 1943 to 1960 the Quebec Sugar Refinery Corporation always consisted of five members from the Cabinet, including the Minister of Agriculture who acted as chairman, the Minister of Finance, and the Minister of Industry and Commerce. In 1960 the Minister of Finance being also Prime Minister, he was replaced by the member for St-Hyacinthe.

Remembering that the refinery at St-Hilaire was established to

promote sugar beet growing in Quebec, we may say that its aim was fully realized. Thus, sugar beet production in Saint-Hyacinthe, Napierville, Bagot, L'Assomption, Rouville, Verchères, Yamaska, and other counties rose from 16,259 tons in 1944 to 177,267 tons in 1970, with a peak yield of 203,606 in 1968. During the same period, payments to growers increased from \$195,114 to \$2,304,472 for a grand total of \$34,500,000.

It was still not yet considered that the time had come to hand over operation of the St-Hilaire refinery, as promised for in the act of 1943, to a cooperative nor to transfer it to private enterprise. To maintain sugar beet production at the level needed to supply a refinery, it is essential that growers be assured of a stable income year by year but this is something that differences in yield and the fluctuations of the sugar market render impossible and which neither a cooperative nor private enterprise can guarantee.

The net income of a sugar beet refinery is directly affected by two big factors which are beyond the control of the growers and the manufacturer, namely:

1. **The price of sugar**, which is set on the London market by a complicated operation of the law of supply and demand. The price varies not only from year to year

but may also fluctuate several times during a single month. Thus, the average price of sugar ranged from \$6.06 to \$9.85 a hundred-weight between 1944 and 1962 rose to \$13.56 in 1963 and then fell again to \$8.60 in 1970. In 1974-75, the price of refined sugar amounted to \$45.35 per hundred-weight compared with \$19.68 in 1973-74;

2. **The sugar content** of the beets, that is to say the number of pounds of sugar which can be extracted from a ton of beets. This depends almost entirely on climatic conditions during the growing season and hence varies from year to year. In 1945, at the St-Hilaire refinery, the average yield of sugar was 183.7 pounds per ton of beets. In 1948 it was 288.1 and in 1970 it was 221.7 pounds. In 1974 it was 243.18 pounds per ton of beets purchased. It should also be pointed out that the sugar beet refinery operates on an essentially seasonal basis. This results unavoidably in comparatively high administration costs and less efficient use of machinery and equipment.

Since 1968 the average sown to sugar beets has been subject to quota in order that the yield will not exceed the refinery's milling capacity of 1600 tons a day.

Summary of Sugar Beet Production from 1944 to 1974

| Year | Number of growers | Acres harvested | Total tonnage | Tons per acre | Price per ton | Return per acre | Return per farm |
|------|-------------------|-----------------|---------------|---------------|---------------|-----------------|-----------------|
| 1944 | 2002 | 2700 | 16,259 | 6.02 | \$12.00 | \$ 72.24 | \$ 97.45 |
| 1949 | 2179 | 6225 | 68,572 | 11.00 | 13.00 | 143.00 | 409.10 |
| 1954 | 1340 | 6473 | 67,609 | 10.44 | 13.00 | 135.72 | 655.91 |
| 1959 | 727 | 4504 | 67,589 | 15.01 | 14.13* | 212.12 | 1,313.85 |
| 1964 | 1214 | 10628 | 150,544 | 14.16 | 16.21* | 229.52 | 2,010.02 |
| 1969 | 807 | 9298 | 158,441 | 17.04 | 15.08* | 256.95 | 2,960.59 |
| 1974 | 312 | 5729 | 81,716 | 14.26 | 35.00 | 499.17 | 9,166.89 |

*The amount by which the price exceeds \$13.00 represents the federal subsidy.

QWI

The Federated Women's Institutes of Canada Annual Board Meeting

The Annual Board Meeting of the Federated Women's Institutes of Canada was held at Carleton University, Ottawa, June 17 to 19, 1975. Mrs. J. McLean, National President, presided at the opening session. Following the Creed a moment of silence was observed in tribute to Mrs. Neil Burden, 3rd Vice-President, who we learned with regret had passed away recently. Mrs. McLean welcomed all members who were present and mentioned that Mrs. J. W. Westover of Quebec and Mrs. J. W. Wallace of Saskatchewan were absent owing to illness. Mrs. McLean said that they would be missed and wished them a speedy recovery.

Mrs. A. K. Segee was appointed Recording Secretary. Mrs. N. Mosher was appointed Public Relations Officer as Mrs. G. Wilson, Editor of The Federated News, was not present owing to illness in her family. In answering the Roll Call each provincial representative gave the highlights of their work during the past year. All representatives were to give or send Mrs. Mosher a copy of their roll call.

The resignation of Mrs. C. Grierson, Convener of Home Economics and Health, was accepted with regret, and Mrs. C. L. Alexander has agreed to finish the balance of Mrs. Grierson's term.

There about 130 copies of The Canadian Heritage on hand. We were reminded to send donations directly to Area Vice-President Mrs. Fulton.

After lunch the Conveners gave their reports, which were very

interesting and covered work done right across Canada. It was decided to carry on all the same complimentary subscriptions of the Federated News.

Mrs. McLean reported on the Hoodless Homestead. It was decided that the insurance on the Home should be increased. Mrs. McLean told us that the entire house needs redecorating as it is 14 years since it was done. It was recommended by the Executive that we apply each year before November 1st for the Government Grant. There is some money available under a Maintenance Grant. The recommendation to redecorate, have the organ repaired, and a rail fence erected was approved by the Board. Mrs. McLean asked that we make this "Homestead Year" on a voluntary basis with a possible contribution of \$1 per branch.

Mrs. Beilish reported on Northern Canada WI and told us she was expecting word from Dawson City where they hope to organize a branch.

Considerable time was spent discussing bylaws. Mrs. Fulton is chairman of this committee and it was decided to have a special meeting to deal with these.

Mrs. F. Ross spoke on the F.W.I.C. Competitions and emphasized that the quilts must **all** be hand made.

Mrs. Thomson's report on the International Peace Garden was read by Mrs. McLean. It was decided that FWIC increase their donation from \$100 to \$200.

Plans for the Convention in Prince Edward Island, June 17-26, 1976:

Maximum registration 550; each province to handle their own registration with a deadline to be set; 10 delegates from each province — as soon as number is known send to registration in P.E.I. If husband and wife are going they must make their own reservations. The registration fee is \$30 with a daily registration fee of \$6. The theme of the Convention is "FOCUS — Facing Our Challenge, Unity is Strength". Mrs. O. L. Farquharson, ACWW President, is being invited to be the guest speaker at the P.E.I. banquet on June 24th. We were asked for voluntary gifts for the Gift Stall — approximately 100 per province, value from \$3 to \$5. These are to be sent to P.E.I. (address to be given later). It was decided to charge \$1 registration fee for any WI member wishing to attend the official opening session. We were asked to pay close attention to dates on registration papers. There will be no refund after May 15, 1976. It is on a first come, first served basis.

Mrs. Fulton reported on the ACWW Conference — she felt that there should be more time at the next triennial for resolutions. Mrs. Fulton reminded us that Contributing Membership to ACWW is now \$6 per year, also that to be eligible to attend the next ACWW Conference you must have been a contributing member for at least three years.

Mrs. McLean was appointed to represent us at the ACWW Council in England. It was decided that Mrs. W. P. Markham of England would be thanked for being our representative to ACWW and reappointed for another term.

The cast of Stanbridge East skit. The players from left to right: Mrs. C. Symington, Mrs. M. Tait, Mrs. M. Harvey, and Mrs. E. TenEyck.



The next ACWW Conference is to be held in Kenya, October 11-22, 1977. On a request from Mrs. Spry, we recommended Mrs. Aroti Dutt as a Member of Honour of ACWW.

It was decided that the Executive would set a date for the Board to meet later this year to discuss bylaws, followed by a seminar. Mrs. Fulton and Mrs. Parker were appointed to the Nominations Committee. Mrs. Zoeller is to chair the Presentation from the Provinces in P.E.I. We will hear from her later. The interest on the Hazel Styles Bequest is to be used at the 1976 Convention.

Mrs. McLean thanked everyone for helping to make the Board meeting a success. Then Mrs. Fulton voiced the thanks of the Board to Mrs. McLean for her time and leadership.

Missisquoi Entertains

About 200 persons gathered in the gymnasium of the Hero's Memorial Elementary School in Cowansville last May when members of the **Missisquoi County W I** and friends took part in an entertainment program.

In her address of welcome, the County President, Mrs. Irene Williams, thanked everyone for coming, those who co-operated in preparing the evening's program, and wished all a pleasant evening. She listed the members of the Fordyce group who were in the play that they had written "The Quilting Party." (This play subsequently went on to the QWI Convention where it won 2nd. prize.) The play will go on to

the FWIC Drama Contest.

The entertainment began with songs by the first Cowansville Brownie Pack. They later contributed with a well done Flag drill and a vote of thanks goes out to the Brownies and their leader for adding much to the program.

Other items were piano and voice solos and duets by various members and their families which received enthusiastic applause. Mrs. Junior Harvey received a pleasant surprise after her part on the program, when Mrs. Williams announced it was Mrs. Harvey's birthday and everyone joined in singing the Birthday song. A non-member, Miss Joyce Burt, presented an hilarious skit which was greatly enjoyed by all. A special thank you goes to her for her time shared in the program. Mrs. Williams sang two songs: "The French Song" done bilingually and an old favourite "Galway Bay". This brought the entertainment part of the program to an end.

In her closing remarks, Mrs. M. Lewis, County Vice-President, thanked the School Board for the use of the gymnasium, the Masons for their hall, where play practices had been held, the adjudicators, and especially Mrs. Williams for her work, time, patience, and her determination to put on the play and keep Missisquoi County in the competition.

The most enjoyable evening ended with everyone singing "God Save the Queen".

The motto at a **Cowansville** meeting: "It is important that people know what you stand for, but it is equally important that

people know what you won't stand for" provided much food for thought. They sent a donation to the United Cemetary Fund as a memorial to Mrs. Wm. Beattie a long time member.

Copies of the booklet "Women and the Law in Quebec" were distributed for study at Dunham. A "health" contest pertaining to parts of the body was enjoyed by the members.

Misses Christine and Isabel Miller were guest speakers at **Fordyce** on nutrition and stressed the importance of proper nutrition to physical and mental health.

Stanbridge East's Roll Call "Name a member of the Provincial Cabinet and tell something about his portfolio" made the ladies aware of their need to know more about their government. Their branch Treasurer is laid up with a foot fracture and the members remembered her with a card.

Dear W. I. Members,

Summer is past and we can say we have had a real one this time. It was very dry and hot in most places and when rain did come, it was in the form of thunderstorms, with hail in many cases. A lot of apples in the Chateauguay-Huntington area were damaged with hail. The apple crop is good on the whole, but the fruit is small. Hay has also been poor. Our province experienced several "twisters" this year, with much damage done — most unusual for us.

Our garden did well, though we had to water during the dry spells.



Top: Mrs. M. Lewis, Provincial Welfare and Health Convener, in the handicrafts room at Convention. Below: Two ladies who were very busy, Mrs. Lancaster and Mrs. Parker, take a break from the registration desk.



Lakefield saw slides and heard about New Guinea.

I was invited to meet a group of ladies from Alberta in August who were members of UNIFARM. They were on an exchange program, which was sponsored by the Federal Government as part of International Women's Year. Their Quebec hostesses were the members of the Cercle des Fermières. They had visited different parts of Quebec, comparing and exchanging farming experiences, prices, marketing, family living, and so on and would prepare a paper for the Alberta government on their return. The ladies I met came from a mixed farming area near Edmonton and they found a lot of the experiences and problems in Quebec were similar to theirs. UNIFARM is a member of ACWW.

Those of you who were at Provincial Convention will remember Mrs. Parker Rockwell, our guest from the Women's National Farm and Garden Association in the U.S. She got back home safely having had a very rushed 38 days after leaving us, but she enjoyed the experience very much. She found Canada a very beautiful country and her meetings with the W. I. most interesting.

The Convention pictures have been spread out this year, but we felt you would like to see as many as possible.

Many of you report successful booths at your County Fairs where either food and articles were sold or handicrafts exhibited. **Frontier** WI has sent three articles to Expo Quebec. **Quyon** prepared an exhibit of eight articles to be shown at their local fair. This branch

We found that mulching was an excellent way of conserving moisture besides being an easy way of keeping down the weeds. We think our prices are high, but other places are much higher — in Barbados it costs 25 cents to buy one egg and hamburger is \$3.50 per pound. Meat in Japan, is around \$8 per pound. I don't think we really appreciate all the things we have — homes, clothes, food, and appliances compared with other countries that have so little. Do remember the Nutrition/Education Fund. This fund has enabled projects to be set up in different areas in India and

Bangladesh and "a centre for study is being opened in one of the poorest regions of Brazil where it is hoped to provide nutrition education to 100 mothers and their pre-school children in the surrounding villages" (Fed. News).

Few meetings were held in the summer but many went on picnics, bus tours, and trips to other parts of Canada and the U.S. and other parts of the world. There will be many interesting travel programs this winter. Already **Arundel** have had an interesting meeting when they saw slides of Bark Lake in all seasons.



helped celebrate the town's 100th. Anniversary by serving tea to about 100 people on the Saturday afternoon of "Old Home Week". One of their older members has received a mohair throw from the Abbie Pritchard Fund.

Many of you know Mrs. Steve Robinson. She has represented **Gatineau County** many times at Macdonald and won many prizes for her lovely knitting. We regret to hear of the sudden death of her husband and offer our sympathies at her loss.

Also from Gatineau County, we hear that Mrs. Carmen MacKenzie and her husband will be celebrating their 50th. wedding anniversary in September. Mrs. MacKenzie is the QWI member who did the needlepoint chair seat for the government chairs at P.E.I. in Centennial year. Best wishes to you both.

A novel Roll Call — "Pay one cent for each item in your purse" netted \$5.24! Their correspondent sent me a dinner menu quiz which I will gladly pass on to any one interested.

Lennoxville WI held a recent meeting in a home for senior citizens and served a salad supper afterwards. They also entertained with songs and music. The branch lost their oldest member recently, Mrs. Mary Worster, who died aged 102.

Dewittville served dinner to the residents of a home for the elderly in **Ormstown**. A Red Cross nurse had gone there to give the residents and others instructions for exercises for seniors and for those with other handicaps.

Other elderly people have been visited and taken for drives.

July parades are part of summer's fun. **Sherbrooke County** report that their float in the Lennoxville Optimist Parade won first prize. The theme, in line with International Women's Year, was "Peace and Equality". It depicted 12 WI members portraying women and their work — many jobs formerly done by men, now being done by women, i.e., veterinary surgeon (armed with a large needle and syringe); minister of the church; bus driver; judge of the courts; plumber; jockey; carpenter; farmerette and M. P. One member remarked that the co-operation made the work of preparing the float seem like fun. It was another way of letting the public know how women are contributing in today's world.

Members have been raising funds in various ways: catering for receptions and dinners; holding auctions; selling yard goods; rummage and phantom sales; bingo; selling plants, candy and food. Donations are made to hospitals, Pennies for Friendship, student loan funds etc. **Fort Coulonge** is giving a prize in the Public School for penmanship. Donations have also been made to memorial funds in memory of departed members. **Huntingdon** raised \$287 at the food sale held in connection with Anniversary Week. This will go to the fund for a Senior Citizens Residence. **Dundee** donated towards repairing their cemetery wall and also towards the purchase of a lot of land for a needy family on which to build a house. **Marcil** gave trophies in three of their schools.

cheerfully greeted members as they gathered for evening refreshments.

We are glad to hear that 6 of the 10 Adelaide Hoodless roses planted by the **Richmond Young Women** WI members have done well this summer. They have distributed yarn for afghans to the ladies of a local home.

An interesting demonstration of bread-making was held in one branch and members enjoyed samples of home-made bread afterwards. Another WI had a pizza-making demonstration and unusual recipes using rhubarb.

International Women's Year was remembered by one group with the reading of a paper on outstanding Canadian women and their contribution to their community or country. Several groups have obtained copies of the booklet "Women and the Law in Quebec" for study.

Among some of the news items this time were a few I thought might help with our programs: At one meeting, the Education Convener passed out paper and asked members to write down topics they would like to hear discussed at a meeting. She would use the answers to help her develop programs. **The Cowansville** members had a demonstration on tying scarves and how to wear them in different sizes. One W.I. used a letter to Ann Landers and had the members give their answers to the problem. This could be a serious subject or a humorous one. "Current Events" is another suggestions — either as a program or as a Roll Call. From **Shipton**: Devote 15 minutes of each program to French conversation.

Mrs. James Robertson,
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